Chapter 49
A Survey on the Use of Adaptive Learning Techniques Towards Learning Personalization

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ABSTRACT

E-learning has a great impact on learners today. E-learning supports enhancing learner knowledge anytime, anywhere with lesser efforts than traditional models. In these situations, nonlinear approaches often modify teaching and learning strategies according to students' needs, and hence, automated machine-guided approaches seem useful in the name of adaptive learning. It identifies individual learner styles and provides the most suitable strategy that fits each learner as a case of personalization. Adaptive learning uses personalization for continuously improving student outcomes. Personalized learning takes place when e-learning systems use educational experience supporting desires, objectives, endowments, and curiosities of each individual learner. This work has reviewed the recent developments in the problem area of learning personalization through adaptive learning. Then the solution domain methods are compared to identify the knowledge and technology gap from their limitations. These analyses help to identify research potentials in learning technology for future works.

INTRODUCTION

Education systems are developing day by day to provide best learning experiences to the learners with proper knowledge acquisition. Various learning methods are used in modern education systems. Mobile learning is one of the popular learning methods nowadays. Mobile learning helps learners to learn by using hand held mobile devices like mobile phones, palmtops, tablets, laptops etc. Mobile learning facilitates learners to acquire learning resources from online educational hubs. Mobile learning allows learners to learn from any place as per their convenience without imposing any time bound to access the learning resources. Mobile learning can incorporate personalized learning methodology that aims to modify the learning process depending on each learner's strengths, requirements, abilities and interests. Personalized learning enables a learner to learn through a learning approach which is established on the facts that what the learner knows and how the learner learns the best. The major aspects of mobile learning are learner adaptation and device adaptation. Learner adaptation depends upon two factors such as knowledge level and learning style. On the other hand, device adaptation refers to the heterogeneities of learning device specifications (Huang et al.,2012). Adaptive learning method involves providing best suited learning contents to each learner through modifiable teaching-learning method as per the needs of each learner. E-learning is one of the contemporary techniques of learning where technology-enhanced learning (TEL) (Chatti et al.,2010) is used. E-learning provides an anytime-anywhere learning platform. Table 1 describes some of the prevailing educational systems and their characteristics.

Table 1. Characteristic features of some popular educational systems

Traditional offline learning System	Offline learning refers to the situation where the learning platform is not handled by any automated system. Hence the input set of data is static. Face to face classroom learning is an example of this type of learning system.
E-learning system	It refers to Electronic learning system where the learners learn through electronic devices and digital media.
Intelligent Learning System(ILE)	In this environment learners have the facility to solve his/her problem. One or more instructor can assist the learner and monitor learner's learning style and activity.
Adaptive learning system	It mostly focuses on learners' needs. Learning contents are modified according to learners' requirements.
Blended learning system(Graham,2006)	It is the combination of both traditional learning and E-learning. But the main focus is to monitor the learners and to improve their performances.

In a conventional classroom situation the instructor instructs numerous learners at the same point of time. In such a situation, individual learners are forced to learn from the same learning resource in a same learning manner. But it may not satisfy each learner's individual need. Hence, it is tremendously complicated for an instructor to resolve the best possible learning strategy for each individual learner in a class. Even if an instructor is capable of resolving all the strategies, it is extremely complicated to incorporate all of those strategies in a particular classroom. Abiding to the situation, it has to be understood that developing a learning model in this circumstances of traditional learning is quietly impossible (Essaid El Bachari et al.,2011). To overcome this deficiency, the escalating development of Recommender Systems (RSs) has facilitated learners to make appropriate decisions. The chief goal of e-commerce RSs is to afford a patron that helps individuals to decide their objectives. It also facilitates

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